

REMARKS

The July 1, 2008 Office Action has been carefully reviewed and considered. Based on the amendments and remarks made herein, Applicant respectfully submits that all claims are patentable over the cited references taken alone or in any combination. Accordingly, Applicant respectfully requests withdrawal of all claim rejections.

Claim Objection

Claim 21 is objected to because the claim includes a dash before the word "filling." The dash delineates different steps in claim 21 (forming ..., producing ..., filling ...), and therefore no correction is needed. Applicant respectfully requests withdrawal of the claim objection.

35 U.S.C. §112 Claim Rejections

Claims 7, 9 and 15 are rejected under 35 U.S.C. §112, second paragraph for being indefinite. Claim 7 is amended herein to recite "said active region for the bipolar transistor." Claims 9 and 15 are not indefinite. Claims 9 and 15 directly depend from claim 1. Claim 1 refers to an active region formed for a bipolar transistor in a silicon substrate. Claim 1 further refers to an active region formed for a MOS device in the silicon substrate. Thus, claim 1 refers to at least two different active regions (one for the bipolar transistor and another for the MOS device). Claim 9 refers to "said active region for the MOS device" and Claim 15 refers to "said active regions for the bipolar transistor and the MOS device." Clearly, the active region terms in claims 9 and 15 have proper antecedent basis in claim 1. Accordingly, Applicant respectfully requests withdrawal of all §112 claim rejections.

35 U.S.C. §102(b) Claim Rejections

Claims 1-9, 20-23 and 29-30 stand rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent Publication No. 2002/0033509 (Ammo). A claim is anticipated when a prior art reference describes all of the claim elements, **arranged as in the claimed invention.**

C.R. Bard, Inc. v. M3 Systems, Inc., 157 F.3d 1340 (Fed. Cir. 1998) (emphasis added). Ammo fails to teach or suggest at least two different features of independent claim 1. As a result, all claim rejections must be withdrawn.

Claim 1 has been amended so that it refers to the claimed electrically insulating layer as a **nitride** material formed on the MOS gate region and on the active region for the bipolar transistor. Claim 1 further recites that a base region is defined in the active region for the bipolar transistor by means of producing an opening in the electrically insulating layer. Thus, to anticipate claim 1, Ammo must disclose producing an opening in a layer of nitride material for defining a base region in an active region of a bipolar transistor.

Ammo discloses a silicon nitride film (17), but the nitride film is removed from the bipolar transistor region (2) of Ammo's device **before** a base opening (18) is formed therein. See paragraphs [0042]-[43] in Ammo. The opening (18) exposes the base region of Ammo's bipolar device so that an electrode (19) can be connected thereto. However, Ammo's base opening (18) is formed in a silicon oxide film (15) which does not contain nitride as claimed. The silicon nitride film (17) is completely removed from the bipolar transistor region (2) before the base opening (18) is formed. This is readily apparent in Figure 4A of Ammo where the dashed region of silicon nitride film (17) indicates the portion of the nitride film that is removed before the base opening (18) is formed in the silicon oxide film (15). Figure 4B shows that the base opening (18) is only formed in the silicon oxide film (15). Thus, Ammo does not teach or suggest forming an opening in a **nitride** layer for defining a base region of a bipolar transistor. For this reason alone, Ammo cannot anticipate any of the pending claims and all rejections must be withdrawn.

Claim 1 also states that the opening in the electrically insulating layer is produced so that the **remaining portions of the electrically insulating layer partly cover the active region for the bipolar transistor**. Ammo fails to teach or suggest this additional claim feature. To the contrary, the silicon nitride layer (17) is removed from the entire bipolar transistor region (2) of

Ammo's device as shown in Figures 4A and 4B. In fact, paragraph [0042] in Ammo explicitly states that "the silicon nitride film 17 is removed except of that in the MOS region 6 and the MISC region 7 by RIE using a resist pattern (not shown) as a mask." Only the silicon oxide film (15) partly covers the bipolar transistor region (2) of Ammo's device, which does not contain nitride as claimed. Ammo not only fails to disclose a silicon nitride layer that partly covers an active region of a bipolar transistor, Ammo actually teaches away from this claim feature because the silicon nitride layer (17) is purposely removed from the entire bipolar transistor region (2). For this additional reason, Ammo cannot anticipate any of the pending claims and all rejections must be withdrawn.

With regard to dependent claim 21, the Examiner states that Ammo discloses producing a field isolation area as a shallow trench in a silicon substrate which extends vertically from the substrate surface down into a buried collector region as recited in claim 21. Particularly, the Examiner argues that the field oxide regions (5) in Ammo are formed as shallow trenches which extend vertically from the substrate surface down into the N+ bulk region (3). Applicant respectfully disagrees. To the contrary, Figure 3A in Ammo clearly shows that the field oxide regions (5) do not extend into the N+ bulk region (3). Instead, the field oxide regions (5) are physically separated from the N+ bulk regions (3) by the collector drawing section (8). Ammo thus cannot anticipate dependent claim 21 and the rejections of claims 21-24 must be withdrawn.

35 U.S.C. §103(a) Claim Rejections

Claims 10-19 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Ammo in view of U.S. Patent No. 6,432,791 (Hunter). Claims 24, 27, 28 and 35 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Ammo in view of U.S. Patent No. 6,455,364 (Asai). Claims 25-26 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Ammo in view of U.S. Patent No. 6,137,154 (Capilla). Claims 31-34 stand rejected under 35

U.S.C. §103(a) as being unpatentable over Ammo in view of U.S. Patent No. 6,399,993 (Ohnishi). Dependent claims 10-19, 24-28 and 31-35 are patentable at least for the same reasons as independent claim 1 described above. Therefore, Applicant respectfully requests withdrawal of the rejections of claims 10-19, 24-28 and 31-35.

With regard to dependent claim 15, it does not appear that the Patent Office has specifically addressed the elements of claim 15. See pp. 7-8 of the Office Action. Claim 15 states that the claimed active regions for the bipolar transistor and the MOS device are formed by means of ion implantation **through an oxide-nitride bi-layer**. In complete contrast, active bipolar and MOS device regions are formed via implantation in both Ammo and Hutter through an uncovered and exposed upper surface of a substrate. For example, see Figure 3A and paragraphs [0035]-[36] in Ammo where an N⁺ bulk bipolar transistor region (3) and a p-well NMOS transistor region (11) are both formed via dopant implantation before either the silicon oxide film (15) or the nitride film (17) are formed on the substrate. Figure 2a and col. 2, lines 18-31 in Hutter similarly disclose forming NPN, NMOS and PMOS N⁺ buried layers (202) in a substrate (200) via dopant implantation before any oxides layers (206, 210) or nitride layers (216) are formed on the substrate (200). Thus, Ammo and Hutter not only fail to disclose forming active bipolar and MOS regions by means of ion implantation through an oxide-nitride bi-layer, they actually teach away from this claim feature by forming active device regions by implanting dopants through an uncovered and exposed upper surface of a substrate. For this additional reason, the rejection of claims 15 is improper and must be withdrawn.

Conclusion

In view of the amendments and remarks made herein, Applicant respectfully submits that the present application is now in condition for immediate allowance. Action to that affect is

respectfully requested. The Examiner is encouraged to contact Applicant's attorney at (919)-854-1844 if any outstanding matters can be readily addressed by a phone call.

Respectfully submitted,

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Dated: September 8, 2008

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